Untangling Empowerment and Contraceptive Use Longitudinally in Five African Settings

Background

Women's empowerment and contraceptive use are intricately linked, each influencing the other in a cyclical relationship. Empowerment, broadly defined as the process by which women gain control over their lives and decisions, has profound implications for reproductive health behaviors. Similarly, access to and use of contraception can significantly impact women's empowerment by enabling them to make informed choices about their reproductive health, leading to broader social and economic benefits and opportunities.

A strong associational relationship between contraceptive use and empowerment has been demonstrated around the world (1–9). Although studies have consistently demonstrated a positive and significant association between contraceptive use and many aspects of empowerment, a mechanistic understanding of the causal relationship is largely missing from the current literature. Does contraceptive use empower women, or do empowered women use contraception? A few studies have been able to examine limited aspects of these causal pathways (10–12). In Malaysia, exposure to family planning early in life increased the probability that women earned wages later in life (13). In Colombia, a widespread family planning program was shown to lead to substantial socio-economic gains (14). However, results continue to be wide-ranging (15–17).

This multidirectional relationship is further complicated by challenges in defining the process of empowerment. We referenced the Can-Act-Resist Framework (18) (Raj, 2020) which operationalizes this process through a series of questions that identify key measures and indicators: Do you want to engage in a particular behavior?; Can you engage in the behavior?; Have you engaged in the behavior?; What happened as a consequence of this action?; and If there was backlash, did you continue to engage in the behavior?. We focus on economic empowerment, defined as a woman's ability to succeed and advance economically and her power to make and act on economic decisions. This includes factors such as labor force participation, education, autonomy and household decision-making power and financial literacy and inclusion.

The complexity of the relationships between empowerment and contraceptive use makes the causality difficult to disentangle. Likely, both directional mechanisms are occurring at different times in women's lives, settings, and experiences, and an understanding of the dynamics of these relationships is critical for family planning and empowerment programs. One step towards building this understanding is the use of longitudinal data, which allows us to show which of these factors is changing first and impacting the others. This paper aims to utilize such data to explore the causal relationship between women's empowerment and contraceptive use based on our causal framework (Figure 1). By examining the temporal sequence and directionality of these variables, we seek to uncover when economic empowerment leads to increased contraceptive use, when contraceptive use serves as a catalyst for women's economic empowerment, or both. Understanding this relationship is crucial for policymakers and program designers aiming to improve reproductive health outcomes and advance gender equality.

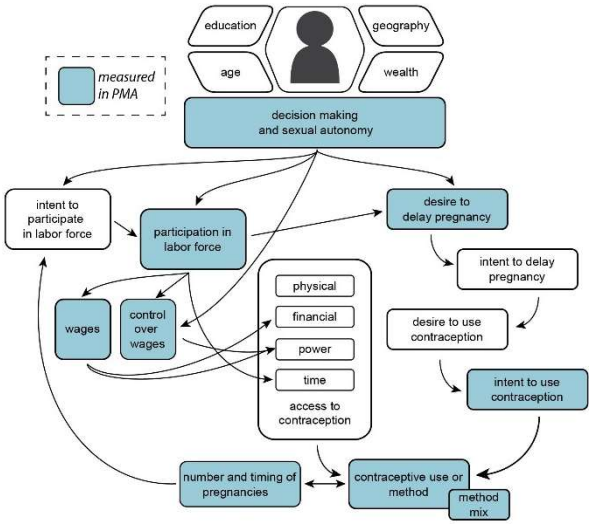

Figure 1. Causal framework. Several aspects of empowerment including labor force participation, control over wages, and decision making and sexual autonomy are intricately and cyclically linked to contraceptive use. The casual framework is complex, and not all aspects are currently measured in the data.

Methods

Data Source

For this analysis, we used data from the Performance Monitoring for Action (PMA) surveys in Kenya, Nigeria (Kano), Burkina Faso, Democratic Republic of Congo (DRC), and Uganda. PMA is a nationally representative survey completed annually. Survey participants are women aged 15 to 49 who are asked about their background, birth histories, family planning methods, fertility preferences, community norms, aspirations, intentions, empowerment, and more. The survey is based on a multi-stage cluster design with urban-rural county as strata. Households are randomly sampled within each representative geographical cluster. Beginning in 2019, PMA implemented a panel design embedded within the cross-sectional surveys, allowing for longitudinal analysis. We

used three years of longitudinal data from 2019, 2020, and 2021. Selected settings had three waves of data available at the time of analysis.

To measure contraceptive use, we chose to look at current use of any method. Methods included implants, injectables, pill, IUD, condoms, sterilization, withdrawal, and other modern or traditional methods. We were also interested in separating the intent to use contraception from the ability to obtain it. To this end, we performed a secondary analysis using intent to use contraception in the next 12 months as the metric. In the PMA data, this question was only asked of women not currently using a method, therefore the secondary analysis is limited to this population.

To measure economic empowerment, we included several metrics (Table 1). These included survey questions measuring components of work, decision making autonomy, and financial autonomy. We also included two aggregate scale metrics, for household decision making and financial autonomy, based on a confirmatory factor analysis on the PMA data (19). While we recognize that empowerment encompasses more than just the factors listed above, we are restricted by the indicators available in the PMA dataset.

Table 1. Empowerment metrics included in analysis. Source PMA data.

Metric	Survey question
Paid work	Aside from your own housework, have you done any work in the last 12 months? AND Are you paid in cash or kind for this work or are you not paid at all?
Work	Aside from your own housework, have you done any work in the last 12 months?
Decision autonomy: her wages[1]	Who usually makes decisions about how your earnings will be used?
Decision autonomy: partner's wages[1]	Who usually makes decisions about how your husband/partner's earnings will be used?
Decision autonomy: major	Who usually makes decisions about making large household purchases?
Decision autonomy: daily	Who usually makes decisions about making household purchases for daily needs?
Decision autonomy: clothes	Who usually makes decisions about buying clothes for yourself?
Decision autonomy: health	ho usually makes decisions about getting medical treatment for yourself?
Savings[2]	Do you currently have any savings for the future?
Financial info[2,3]	Do you know where to go for financial information or advice?
Financial goals[2,3]	Do you have financial goals toward which you are working?
HH decision making[2]	Scale for household decision making based on factor loadings from confirmatory factor analysis (19)
Financial autonomy[2]	Scale for financial autonomy decision making based on factor loadings from confirmatory factor analysis(19)

[1]Not asked in Uganda wave 1, [2]Not asked in Uganda, [3]Only asked in waves 0 and 1

Cross lagged panel models

For this analysis, we used cross-lagged panel models (CLPM). A CLPM is a type of structural equation modeling designed to measure time-lagged associations between two longitudinally assessed variables. The structure of the CLPM is shown in Figure 2. A CLPM can measure cross-lagged effects (λ), the impact of one variable at a previous timepoint on current value of another. This is the key outcome for this analysis. Additionally, it can measure stability coefficients (β), the impact of previous time on current time and time-specific correlations, i.e. the correlation between variables of interest at each time point. These are not key outcomes for our analysis but are important to control for. We also adjusted for confounders at baseline (θ), including age, marital status, highest level of education completed, number of live births, and urban/rural (expect in DRC, where the sample was only in an urban area). The primary model used was implemented as a system of equations described below, and fit as a system of linear probability models.

$$\mathrm{CT}_0 = \nu_{\mathrm{FP},0} + \theta_{\mathrm{FP},a}a + \theta_{\mathrm{FP},m}m + \theta_{\mathrm{FP},s}s + \theta_{\mathrm{FP},b}b + \theta_{\mathrm{FP},u}u + \epsilon_{\mathrm{CT},0}$$
$$\mathrm{CT}_1 = \nu_{\mathrm{FP},1} + \beta_{\mathrm{FP},1,0}\mathrm{CT}_0 + \lambda_{\mathrm{EM},1,0}\mathrm{EM}_0 + \epsilon_{\mathrm{CT},1}$$
$$\mathrm{CT}_2 = \nu_{\mathrm{FP},2} + \beta_{\mathrm{FP},2,1}\mathrm{CT}_1 + \lambda_{\mathrm{EM},2,1}\mathrm{EM}_1 + \lambda_{\mathrm{EM},2,0}\mathrm{EM}_0 + \epsilon_{\mathrm{CT},2}$$
$$\mathrm{EM}_0 = \nu_{\mathrm{EM},0} + \theta_{\mathrm{FP},a}a + \theta_{\mathrm{FP},m}m + \theta_{\mathrm{FP},s}s + \theta_{\mathrm{FP,b}}b + \theta_{\mathrm{FP,u}}u + \epsilon_{\mathrm{FP},0}$$
$$\mathrm{EM}_1 = \nu_{\mathrm{EM},1} + \beta_{\mathrm{EM},1,0}\mathrm{EM}_0 + \lambda_{\mathrm{FP},1,0}\mathrm{CT}_0 + \epsilon_{\mathrm{FP},1}$$
$$\mathrm{EM}_2 = \nu_{\mathrm{EM},2} + \beta_{\mathrm{EM},2,1}\mathrm{EM}_1 + \lambda_{\mathrm{FP},2,1}\mathrm{CT}_1 + \lambda_{\mathrm{FP},2,0}\mathrm{CT}_0 + \epsilon_{\mathrm{FP},2}$$
$$\mathrm{Cov}(\mathrm{FP}_0, \mathrm{EM}_0) = \mathrm{E}[\mathrm{FP}_0 - \mathrm{E}[\mathrm{FP}_0])(\mathrm{EM}_0 - \mathrm{E}[\mathrm{EM}_0])]$$
$$\mathrm{Cov}(\mathrm{FP}_1, \mathrm{EM}_1) = \mathrm{E}[\mathrm{FP}_1 - \mathrm{E}[\mathrm{FP}_1])(\mathrm{EM}_1 - \mathrm{E}[\mathrm{EM}_1])]$$
$$\mathrm{Cov}(\mathrm{FP}_2, \mathrm{EM}_2) = \mathrm{E}[\mathrm{FP}_2 - \mathrm{E}[\mathrm{FP}_2])(\mathrm{EM}_2 - \mathrm{E}[\mathrm{EM}_2])]$$

Where CT is contraceptive use, EM is each of the empowerment metrics, ν represents the intercept, β is the stability coefficients, λ is the cross-lagged effects, ϵ is residual coefficients, θ is confounder coefficients, a is age, m is marriage, s is highest level of education, b is number of live births, and u is urban/rural.

Finally, we were interested in examining the CLPM results in more specific subpopulations. We therefore stratified all models by five separate covariates: work in the agricultural (ag) sector/non-ag sector, married/unmarried, age over/under 25, completed/did not complete primary school, and wealth quintile 1-3/4-5. These are individual stratified models, and so do not consider intersectionality and cannot be directly compared to each other.

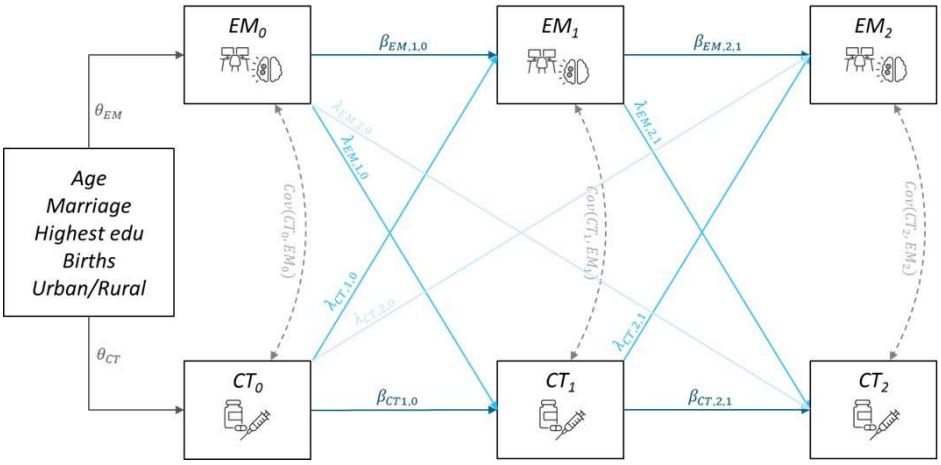

Figure 2. Cross lagged panel model structure, associating empowerment (EM) and contraception (CT) metrics across three time points. Blue arrows are lagged effects, dark blue arrows are stability coefficients, and dashed lines are covariances.

Results

Sample sizes ranged from 842 in Kano to 3,481 in Burkina Faso. In Burkina Faso and Kano, over 70% of women were married, whereas less than 40% were married in DRC and Uganda. Women in Kano and Uganda had had more births. Women in Kenya had the highest contraceptive use rate (55%), and Kano had the lowest (11%), though intent to use contraception in the next 12 months was over 70% in all settings except Kano (40%). The percent of women doing paid work in the past 12 months ranged from 45% in Burkina Faso to 66% in Kano. Self-reported decision making autonomy was generally high in all settings over daily purchases, but lower and more heterogeneous over major purchases and wages.

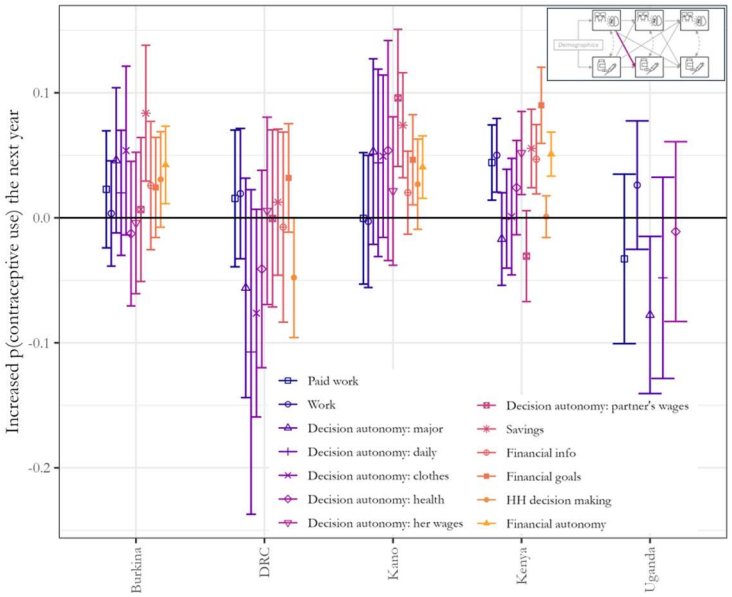

Figure 3. Increased probability of using contraception in year one if a woman was empowered at baseline according to one of the empowerment metrics (e.g. paid work) compared to if she was not empowered. Colors represent each empowerment metric.

In most settings, women who were economically empowered tended to be more likely to use contraception the following year, though which types of economic empowerment were relevant varied by setting (Figure 3). In Kenya, we found that women doing paid work at baseline had a 4.4% increased probability of contraceptive use following a year, and a 5.2% increase when she also had decision making autonomy over those wages. In Kano, decision making autonomy over her partner's wages at baseline led to a 9.6% increased probability of contraceptive use the following year. In both Kenya and Kano, having savings (5.5%, 7.4%, respectively), financial goals (9.0%, 4.6%), and an increased financial autonomy score (5.1%, 4.1%) as well as knowing where to get financial information in Kenya alone (4.7%), were also associated with a probability of using contraception one year later.

In most settings, women who used contraception were more likely to be empowered the following year, though which types of empowerment they achieved varied by setting (Figure 4). Contraceptive use at baseline led to an increased probability of doing paid work in Kenya (10.1%) and Kano (12.0%), as well as an even higher increase (14.5% and 14.8%, respectively), of having decision making autonomy over those wages and an increased probability of having savings (6.8%, 18.4%).

In Burkina Faso, contraceptive use also led to an increased probability of having savings (6.9%) and an increase in the financial autonomy scale (9.3). In Kano, contraceptive use led to a 20% increase in decision making autonomy over major purchases. In Kenya, using contraception also led to a 5.9% increase in knowing where to get financial information, 5.9% increase in having financial goals, and a 9.3 increase in the financial autonomy scale.

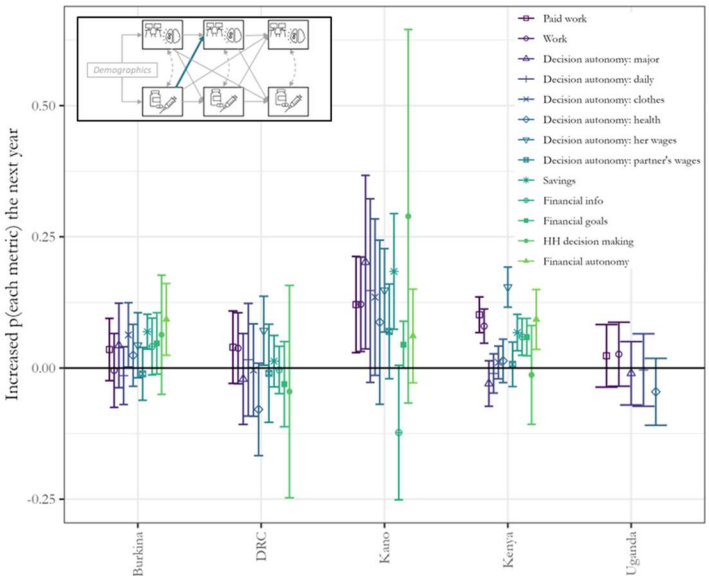

Figure 4. Increased probability of becoming empowered according to one of the empowerment metrics (e.g. paid) at year one if a woman was using contraception at baseline, compared to a woman not using contraception. Colors represent each empowerment metric.

We found that most measures of empowerment did not increase the probability of having intent to use contraception the following year. In the other direction, we found that having intent to use contraception had limited associations with increased empowerment the following year.

The relationship between contraceptive use and empowerment changed by age, sector of work (agricultural or other), marriage status, education, and wealth. For example, in Kenya, contraceptive use led to an increase in doing paid work the following year for women under age 25 and married women, but not for those over age 25 or unmarried. In the reverse direction, women who were doing paid work who did not work in agriculture, were under age 25, unmarried, had higher education, or higher wealth levels, were more likely to use contraception the following year, whereas women who worked in agriculture, were under age 25, married, had lower education or lower wealth, were not more likely to start using contraception. Which subpopulations showed significant effects varied for each metric and setting.

Discussion

The findings from this study underscore the intricate and bidirectional relationship between women's empowerment and contraceptive use. Utilizing longitudinal data from the Performance Monitoring for Action (PMA) surveys across five diverse settings—Kenya, Kano (Nigeria), Burkina Faso, DRC, and Uganda—we provide valuable insights into how these variables influence each other over time.

Our results demonstrate that contraceptive use can act as a catalyst for various aspects of women's empowerment. For example, in Kenya and Kano, contraceptive use was associated with increased participation in paid work and greater control over wages. This finding suggests that in some settings, contraception not only allows women to space and limit births, but also enhances their ability to engage in economic activities and to gain financial autonomy. Conversely, the study also reveals that economic empowerment significantly enhances the likelihood of contraceptive use in some settings.

The variations observed across different settings underscore the importance of context-specific strategies. Our results indicate that economic empowerment initiatives might need to be tailored differently across contexts to effectively enhance contraceptive use and overall empowerment. While there are general trends, the specific socio-cultural and economic contexts play a critical role in shaping these dynamics.

This study was limited by the time scale of data. The PMA data only covers three years, which is not long enough to observe meaningful change in empowerment at a societal scale. Additionally, causal interpretations based on this study should be drawn cautiously. Significant complexity exists, and many societal and individual factors, such as societal norms and fertility preferences, are changing simultaneously with the metrics studied here.

Understanding the bidirectional relationship between women's economic empowerment and contraceptive use is crucial for designing effective interventions. Policies and programs aimed at enhancing women's reproductive health need to simultaneously address various empowerment dimensions. In conclusion, this study highlights the cyclical nature of empowerment and contraceptive use and emphasizes the need for integrated approaches that consider the multifaceted and context-specific factors influencing these dynamics.

References

1. Al Riyami A, Afifi M, Mabry RM. Women's Autonomy, Education and Employment in Oman and their Influence on Contraceptive Use. Reprod Health Matters [Internet]. 2004 [cited 2024 May 22];12(23):144–54. Available from: https://www.tandfonline.com/doi/abs/10.1016/S0968-8080%2804%2923113-5
2. John NA, Tsui AO, Roro M. Quality of Contraceptive Use and Women's Paid Work and Earnings in Peri-Urban Ethiopia. Fem Econ [Internet]. 2020 Jan 2 [cited 2024 May 22];26(1):23–43. Available from: https://www.tandfonline.com/doi/abs/10.1080/13545701.2019.1632471
3. Blackstone SR. WOMEN'S EMPOWERMENT, HOUSEHOLD STATUS AND CONTRACEPTION USE IN GHANA. J Biosoc Sci [Internet]. 2017 Jul 1 [cited 2024 May 22];49(4):423–34. Available from: https://www.cambridge.org/core/journals/journal-of-biosocial-science/article/abs/womens-empowerment-household-status-and-contraception-use-in-ghana/AC205264D2A8AD6FD658BAF5183F3182
4. Tiruneh FN, Chuang KY, Ntenda PAM, Chuang YC. Factors associated with contraceptive use and intention to use contraceptives among married women in Ethiopia. Women Health [Internet]. 2016 Jan 2 [cited 2024 May 22];56(1):1–22. Available from: https://www.tandfonline.com/doi/abs/10.1080/03630242.2015.1074640
5. Islam AZ, Mondal MdNI, Khatun MtL, Rahman MdM, Islam MdR, Mostofa MdG, et al. Prevalence and Determinants of Contraceptive use among Employed and Unemployed Women in Bangladesh. Int J MCH AIDS [Internet]. 2016 [cited 2024 May 22];5(2):92. Available from: /pmc/articles/PMC5187648/
6. Lassi ZS, Rahim KA, Stavropoulos AM, Ryan LM, Tyagi J, Adewale B, et al. Use of contraceptives, empowerment and agency of adolescent girls and young women: a systematic review and meta-analysis. BMJ Sex Reprod Health [Internet]. 2024 [cited 2024 May 20];0:1–17. Available from: http://jfprhc.bmj.com/
7. Khatun N, Howlader S, Rahman MM. Women's Sexual Empowerment and Its Relationship to Contraceptive Use in Bangladesh: Findings From a Recent National Survey. Int J Public Health. 2023;68.
8. Yaya S, Uthman OA, Ekholuenetale M, Bishwajit G. Women empowerment as an enabling factor of contraceptive use in sub-Saharan Africa: A multilevel analysis of cross-sectional surveys of 32 countries. Reprod Health [Internet]. 2018 Dec 20 [cited 2024 May 20];15(1):1–12. Available from: https://reproductive-health-journal.biomedcentral.com/articles/10.1186/s12978-018-0658-5
9. Efendi F, Sebayang SK, Astutik E, Reisenhofer S, McKenna L. Women's empowerment and contraceptive use: Recent evidence from ASEAN countries. PLoS One [Internet]. 2023 Jun 1 [cited 2024 May 20];18(6):e0287442. Available from: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0287442
10. Bank W. Fertility, Child Work, and Schooling Consequences of Family Planning Programs: Evidence from an Experiment in Rural Bangladesh nistha sinha.
11. Schultz TP, Joshi S. Family Planning as an Investment in Development: Evaluation of a Program's Consequences in Matlab, Bangladesh [Internet]. 2007. Available from: http://www.econ.yale.edu/~egcenter/http://ssrn.com/abstract=962938
12. Phillips JF, Hossain MB. The Impact of Household Delivery of Family Planning Services on Women's Status in Bangladesh. Int Perspect Sex Reprod Health [Internet]. 2003 [cited 2024 May 21];29(3):128. Available from: https://www-guttmacher-org.offcampus.lib.washington.edu/journals/ipsrh/2003/09/impact-household-delivery-family-planning-services-womens-status-bangladesh
13. Kimberly Singer Babiarz JL, GM, TNP and CV. Family Planning and Women's Economic Empowerment: Incentive Effects and Direct Effects among Malaysian Women - Working Paper 471 [Internet]. [cited 2024 Jan 25]. Available from: https://www.cgdev.org/publication/family-planning-and-womens-economic-empowerment-incentive-effects-and-direct-effects
14. Miller G. Contraception as Development? New Evidence from Family Planning in Colombia*. The Economic Journal [Internet]. 2010 Jun 1 [cited 2024 May 21];120(545):709–36. Available from: https://onlinelibrary.wiley.com/doi/full/10.1111/j.1468-0297.2009.02306.x

15. O'Brien ML, Zimmermann M, Eitmann L, Chao DL, Proctor JL. Contraceptive Adoption and Changes in Empowerment in Kenya, Nigeria, and Senegal. Stud Fam Plann. 2023 Dec 1;54(4):609–23.
16. Jensen R. DO LABOR MARKET OPPORTUNITIES AFFECT YOUNG WOMEN'S WORK AND FAMILY DECISIONS? EXPERIMENTAL EVIDENCE FROM INDIA. Source: The Quarterly Journal of Economics [Internet]. 2012 [cited 2024 May 20];127(2):753–92. Available from: https://www.jstor.org/stable/23251997
17. Heath R, Mobarak MA. Manufacturing growth and the lives of Bangladeshi women. J Dev Econ. 2015 Jul 1;115:1–15.
18. Raj A. Women and girls' health agency: Operationalizing the "Can-Act-Resist" of the women's empowerment process. Vol. 20, EClinicalMedicine. Lancet Publishing Group; 2020.
19. Cardona C, Williams A, Gummerson E, Ahmed S, Anglewicz P. Measuring Women's Economic Empowerment in the Democratic Republic of Congo, Kenya, Nigeria, and Burkina Faso. Fem Econ. 2024;

Figures

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